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(54) **CANNABIS PLANT NAMED ‘GRAPE LOLIPOP’**

(50) Latin Name: ***Cannabis* hybrid**
Varietal Denomination: **GRAPE LOLIPOP**

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See application file for complete search history.

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(57) **ABSTRACT**

The present invention provides a new and distinct cannabis cultivar designated as ‘GRAPE LOLIPOP’. Disclosed herein are main terpenes of ‘GRAPE LOLIPOP’, which are myrcene, limonene, beta-caryophyllene, alpha-pinene, alpha-humulene, beta-pinene, and linalool. Also, the present invention provides the estimated concentration of the THC_{max} , CBD_{max} , and CBG_{max} about 3.09-7.59%, about 9.97-16.68% and about 0.21-0.70% respectively, at the time of assaying metabolites from flower samples of ‘GRAPE LOLIPOP’.

7 Drawing Sheets

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Latin name of genus and species: *Cannabis* hybrid.
Variety denomination: ‘GRAPE LOLIPOP’.

BACKGROUND OF THE INVENTION

The present invention relates to a new and distinct *cannabis* cultivar designated as ‘GRAPE LOLIPOP’.

This new cultivar is the result of controlled-crosses between proprietary cultivars made by the inventors. The new cultivar of ‘GRAPE LOLIPOP’ was asexually reproduced via a stem ‘cutting’ and ‘cloning’ method by the

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inventors at Salinas, Calif. Asexual clones from the original source have been tested in greenhouses, nurseries, and/or fields. The properties of each cultivar were found to be transmissible by such asexual reproduction. The cultivar is stable and reproduces true to type in successive generations of asexual reproduction.

TAXONOMY AND NOMENCLATURE

Cannabis, more commonly known as marijuana, is a genus of flowering plants that includes at least three species,

Cannabis sativa, *Cannabis indica*, and *Cannabis ruderalis* as determined by plant phenotypes and secondary metabolite profiles. In practice however, *cannabis* nomenclature is often used incorrectly or interchangeably. *Cannabis* literature can be found referring to all *cannabis* varieties as “*sativas*” or all cannabinoid producing plants as “*indicas*”. Indeed the promiscuous crosses of indoor *cannabis* breeding programs have made it difficult to distinguish varieties, with most *cannabis* being sold in the United States having features of both *sativa* and *indica* species.

Human cultivation history of *Cannabis* dates back 8000 years (Schultes, R E., 1970, Random thoughts and queries on the botany of *Cannabis*. Pages 11-38 in: C R B Joyce, and S H Curry eds., THE BOTANY AND CHEMISTRY OF CANNABIS. J. & A. Churchill. London, England). Hemp cloth recovered in Europe dates back 6000 years (Small, E, Beckstead, H D, and Chan, A, 1975, The evolution of cannabinoid phenotypes in *Cannabis*, ECONOMIC BOTANY 29(3):219-232). The written record of the pharmacologic properties of *Cannabis* goes back more than 4000 years (Ti, H. 2737 BC. NEI JING SU WEN HUANG TI, Yellow Emperor's Classic on Internal Medicine; referred to without citation in Small et al. 1975 Supra).

The taxonomy and nomenclature of the highly variable genus *Cannabis* (Emboden, W A, 1974, ECONOMIC BOTANY 28(3):304-310; Small, E and Cronquist, A, 1976, TAXON 25(4):405-435; Small E and Cronquist, A, 1977, TAXON 26(1):110; Hillig, K W and Mahlberg, P G, 2004, American Journal of Botany 91(6):966-975), remains in question. This is in spite of the fact that its formal scientific name, ‘*Cannabis sativa* L.’, assigned by Carolus Linnaeus (Linnaeus, C, 1753, SPECIES PLANTARUM, 2:1027, Salvius, Stockholm, Facsimile edition, 1957-1959, Ray Society, London, U.K.), is one of the oldest established names in botanical history and is still accepted to this day.

Another species in the genus, ‘*Cannabis indica* Lam.’ was formally named somewhat later (de Lamarck, J B, 1785, ENCYCLOPEDIE METHODIQUE DE BOTANIQUE, 1(2):694-695), but is still very old in botanical history. In 1785, Jean-Baptiste Lamarck published a description of a second species of *Cannabis*, which he named *Cannabis indica*. Lamarck based his description of the newly named species on plant specimens collected in India. *C. indica* was described as relatively short, conical, and densely branched, whereas *C. sativa* was described as tall and laxly branched (Schultes R. E. et al, 1974, Harvard University Botanical Museum Leaflets, 23:337-367). *C. indica* plants were also described as having short, broad leaflets whereas those of *C. sativa* were characterized as relatively long and narrow (Anderson L. C., 1980, Harvard University Botanical Museum Leaflets, 28:61-69). *C. indica* plants conforming to Schultes’ and Anderson’s descriptions may have originated from the Hindu Kush mountain range. Because of the often harsh and variable (extremely cold winters, and warm summers) climate of those parts, *C. indica* is well-suited for cultivation in temperate climates.

Three other species names were proposed in the 1800s to distinguish plants with presumably different characteristics (*C. macrosperma* Stokes, *C. chinensis* Delile, *C. gigantea* Vilmorin), none of which are accepted today, although the epithet “*indica*” lives on as a subspecies of *C. sativa* (‘*C. sativa* ssp. *indica* Lam.’, Small and Cronquist 1976 Supra).

In the 20th century, two new names were added to the liturgy of proposed ‘*Cannabis* species: *C. ruderalis*’ Janischewsky and a hybrid, x ‘*C. intersita*’ Sojak. (Small, E, Jui,

P Y, and Lefkovitch, L P, 1976, SYSTEMATIC BOTANY 1(1):67-84; Small and Cronquist 1976 Supra). Further, numerous names have been proposed for horticultural variants of ‘*Cannabis*’ but as of 1976, “very few of these have been validly published as formal taxa under the International Code of Botanical Nomenclature” (Small and Cronquist 1976 Supra). Moreover, other recent work continues to focus on higher-order evolutionary relationships of the genus. *Cannabis* has been variously ascribed as belonging to mulberry family (Moraceae) (Engler, H G A, Ulmaceae, Moraceae and Urticaceae, pages 59-118 in: A. Engler and K. Prantl eds., 1889, DIE NATURLICHEN PFLANZENFAMILIEN 3(1). W. Engelmann, Leipzig, Germany; Judd, W S, Sanders, R W, and Donoghue, M J, 1994, HARVARD PAPERS IN BOTANY 5:1-51; Humphries, C J and Blackmore, S, A review of the classification of the Moraceae, pages 267-277 In: Crane and Blackmore 1989 id.); nettle family (Urticaceae) (Berg, C C, Systematics and phylogeny of the Urticales, pages 193-220, in: P. R. Crane and S. Blackmore eds., 1989, EVOLUTION, SYSTEMATIC, AND FOSSIL HISTORY OF THE HAMAMELIDAE, VOL. 2, HIGHER HAMAMELIDAE, Clarendon Press, Oxford, U.K.); and most recently in its own family with hops (*Humulus*), Cannabaceae, or hemp family (Sytsma, K J, et al, 2002, AMERICAN JOURNAL OF BOTANY 89(9): 1531-1546). While the work of Small and Cronquist 1976 Supra, seemed to effectively confine the genus to a single species with 2 subspecies (*C. sativa* s., *C. s. indica*), each with two varieties (*C. s. s. var. sativa*, *C. s. s. var. spontanea*; *C. s. i. var. indica*, *C. s. i. var. Kafiristanica*) largely on the basis of chemotaxonomy and interfertility of all forms, more recent work (Sytsma et al. 2002 Supra), proposes a two-species concept, resurrecting the binomial *C. indica* Lam. Since Sytsma et al. (2002) provides no key for discriminating between the species, the dichotomous key of Small and Cronquist (1976), which accounts for all forms in nature, whether wild or domesticated, is preferred to classify the characteristics of the plants.

BRIEF SUMMARY OF THE INVENTION

This invention relates to a new and distinctive *cannabis* cultivar designated as ‘GRAPE LOLIPOP’, as disclosed in U.S. Provisional Patent Application No. 62/596,561. The GNBR internal codes and original variety names were correct for ‘Grape Lolipop’ and ‘Myrical Muffin’ as provided at that time in U.S. Provisional Patent Application Ser. No. 62/596,561, filed Dec. 8, 2017. Priority is claimed to that application in the instant application. However, GNBR internal code, B4.B4.C5.03.22, whose common name was ‘Grape Lolipop’, was removed from production; and, GNBR internal code, G2.C5.P1.04, whose common name was previously ‘Myrical Muffin’, became the common name ‘Grape Lolipop’. Thus, all references to ‘Myrical Muffin’ in the priority application, including the Figures, now apply to ‘Grape Lolipop’ of the instant application.

The objective of the breeding program which produced novel plants disclosed herein was primarily to develop a *cannabis* cultivar with its unique blend of various cannabinoids and/or terpenes for (a) medicinal effects such as improving appetite and reducing nausea, vomiting and/or chronic pain, as well as neurological and cardiovascular effects, (b) psychoactive effects such as increased motivation and energetic behavior rather than indifference, pas-

siveness and lethargy, and (c) recreational effects with enhanced enjoyment such as food and aroma.

As used herein, the term “cultivar” is used interchangeably with “variety”, “strain”, and/or “clone”.

Cannabis plants produce a unique family of terpeno-phenolic compounds. Cannabinoids, terpenoids, and other compounds are secreted by glandular trichomes that occur most abundantly on the floral calyxes and bracts of female plants. As a drug it usually comes in the form of dried flower buds (marijuana), resin (hashish), or various extracts collectively known as hashish oil. The *cannabis* plant has at least 545 distinct compounds that span 20 chemical classes including cannabinoids, terpenes, terpenoids, amino acids, nitrogenous compounds, simple alcohols, aldehydes, ketones, esters, lactones, acids, fatty acids, steroids, non-cannabinoid phenols, pigments, flavonoids, vitamins, proteins, enzymes, glycoproteins, and hydrocarbons. Terpenes and/or cannabinoids, in particular, have shown great potential in terms of medicinal value.

Terpenes and/or cannabinoids have been shown to be largely responsible for beneficial effects of a *cannabis* plant. In fact, each *cannabis* plant has the varying concentrations of medically viable compounds depending on different strains (genotypes) and their resulting chemotypes. Even a small variation in terpene and/or cannabinoid concentration can cause noticeable differences in the entourage and/or synergistic effects of a *cannabis* plant, which distinguishes one variety from another. Research shows that it relies heavily on the physiological effects produced by terpenes and/or cannabinoids.

Over 100 different kinds of terpenes have been identified in *cannabis* plants although not being as well-studied as cannabinoids, they are instrumental in giving rise to the physiological and psychoactive effects in *cannabis*.

Terpenes are a large and diverse class of organic compounds, produced by a variety of plants. They are often strong smelling and thus may have had a protective function. Terpenes are an important component, not only influencing taste and smell of each *cannabis* strain but also influencing its effects on the mind and body of a subject such as humans and animals. Terpenes are a classification of organic molecules that are found in a wide variety of plants and animals. These molecules are known for their characteristic scents and flavors. The varying terpene concentrations found in *cannabis* plants directly influence the resulting taste and smell, as well as the observed effects. Non-limiting examples of terpenes include Hemiterpenes, Monoterpenes, Sesquiterpenes, Diterpenes, Sesterterpenes, Triterpenes, Sesquaterpenes, Tetraterpenes, Polyterpenes, and Norisoprenoids. The main terpenes found in *cannabis* plants include, but are not limited to, myrcene, limonene, caryophyllene, pinene, terpinene, terpinolene, camphene, terpineol, phellandrene, carene, humulene, pulegone, sabinene, geraniol, linalool, fenchol, borneol, eucalyptol, and nerolidol.

Cannabinoids are the most studied group of the main physiologically active secondary metabolites in *cannabis*. The classical cannabinoids are concentrated in a viscous resin produced in structures known as glandular trichomes. At least 113 different cannabinoids have been isolated from *cannabis* plants. The main classes of cannabinoids from *cannabis* include tetrahydrocannabinol (THC), cannabidiol (CBD), cannabigerol (CBG), and cannabinol (CBN). Cannabinoid can be at least one of a group comprising tetrahydrocannabinol (THC), cannabidiol (CBD), cannabigerol

(CBG), cannabinol (CBN) cannabichromene (CBC), cannabinodiol (CBDL), cannabicyclol (CBL), cannabivarin (CBV), tetrahydrocannabivarin (THCV), cannabidivarin (CBDV), cannabigerovarin (CBGV), cannabichromevarin (CBCV), cannabigerol monomethyl ether (CBGM), cannabielsoin (CBE), cannabicitran (CBT), cannabinol propyl variant (CBNV), cannabitriol (CBO), tetrahydrocannabinolic acid (THCA), tetrahydrocannabivarinic acid (THCVA), cannabidiolic acid (CBDA), cannabigerolic acid (CBGA) and cannabinerolic acid.

Most cannabinoids exist in two forms, as acids and in neutral (decarboxylated) forms. The acidic form of cannabinoids is designated by an “A” at the end of its acronym (i.e. THCA). The cannabinoids in their acidic forms (those ending in “-A”) can be converted to their non-acidic forms through a process called decarboxylation when the sample is heated. The phytocannabinoids are synthesized in the plant as acidic forms. While some decarboxylation does occur in the plant, it increases significantly post-harvest and the kinetics increase at high temperatures (Flores-Sanchez and Verpoorte, 2008, Plant Cell Physiol. 49(12): 1767-1782). The biologically active forms for human consumption are the neutral forms. Decarboxylation is usually achieved by thorough drying of the plant material followed by heating it, often by combustion, vaporization, heating, or baking in an oven. Unless otherwise noted, references to cannabinoids in a plant include both the acidic and decarboxylated versions (e.g., CBD and CBDA).

The molecules lose mass through the process of decarboxylation. In order to find the total theoretical active cannabinoids, the acid forms should be multiplied by 87.7%. For example, THCA can be converted to active THC using the formula: $THCA \times 0.877 = THC$. The maximum THC for the sample is: $THC_{max} = (THCA \times 0.877) + THC$. This method has been validated according to the principles of the International Conference on Harmonization. Similarly, CBDA can be converted to active CBD and the yield is determined using the yield formula: $CBDA \times 0.877 = CBD$. Also the maximum amount of CBD yielded, i.e. max CBD for the sample is: $CBD_{max} = (CBDA \times 0.877) + CBD$. Additionally, CBGA can be converted to active CBG by multiplying 87.8% to CBGA. Thus, the maximum amount of CBG is: $CBG_{max} = (CBGA \times 0.878) + CBG$.

The biologically active chemicals found in plants, phytochemicals, may affect the normal structure or function of the human body and in some cases treat disease. The mechanisms for the medicinal and psychoactive properties of a *cannabis* plant, like any medicinal herb, produce the pharmacologic effects of its phytochemicals, and the key phytochemicals for a medical *cannabis* plant are cannabinoids and terpenes.

Δ^9 -Tetrahydrocannabinol (THC) is a psychoactive cannabinoid responsible for many of the effects such as mild to moderate pain relief, relaxation, insomnia and appetite stimulation. THC has been demonstrated to have antidepressant effects. The majority of strains range from 12-21% THC with very potent and carefully prepared strains reaching even higher. While Δ^9 -Tetrahydrocannabinol (THC) is also implicated in the treatment of disease, the psychotropic activity of THC makes it undesirable for some patients and/or indications.

Tetrahydrocannabinol, THC, is the primary psychoactive and medicinal cannabinoid and is the result of the decarboxylation of tetrahydrocannabinolic acid (THC-A), its acidic precursor. THCA, (6a,10a)-1-hydroxy-6,6,9-trim-

ethyl-3-pentyl-6a,7,8,10a-tetrahydro-6h-benzochromene-2-carboxylic acid, is found in the trichomes of the plant and converted into THC, which actually exists in only minute quantities in the living plant, after harvest and drying.

Cannabidiol (CBD) is one of the principal cannabinoids found in a *cannabis* plant and is largely considered to the most medically significant. CBD occurs in many strains, at low levels, <1%. In some cases, CBD can be the dominant cannabinoid, as high as 15% by weight. CBD is non-psychoactive, meaning that unlike THC, CBD does not cause a noticeable "high". CBD has shown potential for medical properties in the treatment of a wide variety of diseases and symptoms, including cancer, nausea, chronic pain, spasms, seizures/epilepsy, anxiety, psoriasis, Crohn's disease, rheumatoid arthritis, diabetes, schizophrenia, post-traumatic stress disorder (PTSD), alcoholism, strokes, multiple sclerosis, and cardiovascular disease. CBD also has been reported to act as a muscle relaxant, antibiotic, anti-inflammatory, and bone stimulant, as well as to improve blood circulation, cause drowsiness, and protect the nervous system. It can provide relief for chronic pain due to muscle spasticity, convulsions and inflammation, as well as effective relief from anxiety-related disorders. It can offer relief for patients with Multiple Sclerosis (MS), Fibromyalgia and Epilepsy. CBD has also been shown to inhibit cancer cell growth when injected into breast and brain tumors in combination with THC.

A *cannabis* cultivar can be used to achieve the desire of patients to be treated with CBD without the adverse side-effects (e.g., psychoactivity) of THC.

Cannabichromene (CBC) is a rare, non-psychoactive cannabinoid, usually found at low levels (<1%) when present. It has been shown to have anti-depressant effects and to improve the pain-relieving effects of THC. Studies have demonstrated that CBC has sedative effects such as promoting relaxation.

Cannabidiol (CBD) and cannabichromene (CBC) are both non-psychoactive and end products of CBG metabolism, like THC, so that they can be used medically.

Cannabigerol (CBG) is a non-psychoactive cannabinoid. CBG-acid is the precursor to both THC-acid and CBD-acid in the plant usually found at low levels (<1%) when present. It has been demonstrated to have both pain relieving and inflammation reducing effects. CBG reduces intraocular pressure, associated with glaucoma. CBG has been shown to have antibiotic properties and to inhibit platelet aggregation, which slows the rate of blood clotting. While Cannabigerol (CBG), is not considered psychoactive, it is known to block the psychoactive effects of THC and is considered medically active in a variety of conditions. Its precursor, cannabigerolic acid, CBGA, (E)-3-(3,7-Dimethyl-2,6-octadienyl)-2,4-dihydroxy-6-pentylbenzoic acid, is being studied medically.

Cannabinol (CBN) is an oxidative degradation product of THC. It may result from improper storage or curing and extensive processing, such as when making concentrates. It is usually formed when THC is exposed to UV light and oxygen over time. CBN has some psychoactive properties, less strength than THC. CBN is thought to enhance the dizziness and disorientation that users of *cannabis* may experience. It may cause feelings of grogginess, but has been shown to reduce heart rate.

High potency *cannabis* plants contain large quantities of specific terpenes as well as various assortments of other terpenes. For instance, a *cannabis* plant may have a profile

with either a high level of, a moderate amount of, or a small amount of various terpenes depending on its cultivar and environmental conditions.

Various cultivars of '*Cannabis*' species have been cultivated in an effort to create a cultivar best suited to meet the interest of inventors according to their own need. The particular plant disclosed herein was discovered in the area where the inventors were intentionally cross-pollinating and cultivating plants described below using standard Mendelian breeding procedures well known to those of ordinary skill in the art. This resulted in the progenies of the inventors' crosses.

The progenies resulting from any selection stage of either the crossing, selfing or backcrossing versions of the breeding regimes of the present invention were asexually reproduced to fix and maintain the desirable THC content, CBs content, terpenes content, the aroma and flavor(s) typical of the desired class, and the other desirable phenotypic and/or genotypic characteristics. The resultant selected *cannabis* cultivar is designated as 'GRAPE LOLIPOP' disclosed herein.

The inventors reproduced progenies asexually by stem cutting and cloning. This is the origin of this remarkable new cultivar. The plant has been and continues to be asexually reproduced by stem cutting and cloning at the inventors' greenhouses, nurseries and/or fields in Salinas, Calif., Oakland, Calif., and/or Washington, D.C.

The following are the most outstanding and distinguishing chemical characteristics of this new cultivar when grown under normal conditions in Salinas, Calif. Chemical analyses of the new *cannabis* variety and the check variety (or the parental varieties) disclosed herein were performed using standard chemical separation techniques well known to those skilled in the art. Samples for assaying were obtained from flower tissues of the *cannabis* plant disclosed herein. Cannabinoid composition of this cultivar can be determined by assaying the concentration of at least one cannabinoid in a subset (e.g., sample) of the harvested product.

Table 1 includes detailed information of the *cannabis* plant named 'GRAPE LOLIPOP' including the concentration ranges of terpenes and cannabinoids as tested on flowers at least fourteen different times. The *cannabis* plant has been tested in a laboratory setting and/or facility to determine cannabinoids and terpenes concentrations in the *cannabis* plant named 'GRAPE LOLIPOP' according to the procedures provided in Giese et al. (Journal of AOAC International (2015) 98(6):1503-1522).

- 1) The main terpenes found in 'GRAPE LOLIPOP' are myrcene, limonene, beta-caryophyllene, alpha-pinene, alpha-humulene, beta-pinene, and linalool; and
- 2) The estimated concentration of the total THC_{max}, CBD_{max}, and CBG_{max} is about 3.09-7.59%, about 9.97-16.68%, and about 0.21-0.70%, respectively, at the time of assaying metabolites from flower samples of 'GRAPE LOLIPOP'.

Terpene and cannabinoid profiles of 'GRAPE LOLIPOP' demonstrate that 'GRAPE LOLIPOP' has a phenotypically unique profile, particular insofar as to the level of terpenes and cannabinoids. This data is presented in a tabular form in Table 1.

TABLE 1

Ranges of Active Cannabinoids and Terpenes					
Ranges of Active Cannabinoids (% by weight)					
Max THC	3.09-7.59%	Max CBD	9.97-16.68%	Max CBG	0.21-0.70%
Ranges of Terpenes (% by weight)					
thujene	0.00%	gamma-terpinene	0.00%	hexyl hexanoate	0.00-0.04%
alpha-pinene	0.10-0.30%	linalool oxide	0.00%	octyl butyrate	0.00-0.04%
camphene	0.00%	terpinolene	0.00-0.01%	beta-caryophyllene	0.10-0.39%
sabinene	0.00%	fenchone	0.00-0.02%	alpha-humulene	0.05-0.22%
beta-pinene	0.09-0.18%	linalool	0.06-0.19%	cis-nerolidol	0.05-0.09%
myrcene	1.58-3.44%	fenchol	0.02-0.05%	trans-nerolidol	0.04-0.06%
alpha-phellandrene	0.00%	—	—	caryophyllene oxide	0.00-0.03%
carene	0.00%	camphor	0.00%	alpha-bisabolol	0.00-0.06%
alpha-terpinene	0.00%	isoborneol	0.00%	nerol	0.03%
limonene	0.22-0.46%	(-) borneol	0.00-0.02%	geraniol	0.00%
beta-phellandrene	0.00%	menthol	0.00%	geranyl-acetate	0.00-0.04%
cineole	0.00%	hexyl butyrate	0.00%	methyl-eugenol	0.00-0.01%
cis-ocimene	0.00%	alpha-terpineol	0.00-0.06%	Total Terpenes	2.77-4.86%
trans-ocimene	0.00%	citronellol	0.00-0.04%	—	—

The *cannabis* plant named 'GRAPE LOLIPOP' has a complement of terpenes, including but not limited to, relatively high levels of myrcene, limonene, beta-caryophyllene, alpha-pinene, alpha-humulene, beta-pinene, and linalool compared to other terpene compounds. This unique combination of differently concentrated terpenes further distinguishes 'GRAPE LOLIPOP' from other varieties in its odor, its medical qualities, and its effects on mood and mentation.

Asexual Reproduction

Asexual reproduction, also known as "cloning", is a process well known to those of ordinary skill in the art of *cannabis* production and breeding and includes the following steps.

The *cannabis* cultivar disclosed herein is asexually propagated via taking cuttings of shoots and putting them in rock wool cubes. These cubes are presoaked with pH adjusted water and kept warm (~80° F.). Full trays are covered, left under 18 hours of light and allowed to root (7-14 days). Upon root onset, the plantlets are transplanted into rigid 1 gallon containers filled with a proprietary soil mix A and remain in 18 hours of daylight for another 14-21 days. Once root-bound, plants are transplanted into rigid 3 gallon containers filled with proprietary soil mix B. Immediately, the light cycle is altered to 12/12 and flower initiating begins. The plants remain in 12/12 lighting until harvesting. They undergo a propriety nutrient regimen and grow as undisturbed as possible for 60-70 days depending on chemotype analysis.

All sun leaves are removed and the plant is dismantled to result in approximately 12" branches covered in inflorescences and trichomes. The goal in harvesting is to actually harvest trichome heads but not 'buds'. Thus, great care is taken not to disturb the trichome heads and as much of the

plant remains intact as possible to promote even and slow drying. Slow drying is followed by a one to two months curing process.

Observation of the all female progenies of the original plant has demonstrated that this new and distinct cultivar has fulfilled the objectives and that its distinctive characteristics are firmly fixed and hold true from generation to generation vegetatively propagated from the original plant.

Under careful observation, the unique characteristics of the new cultivar have been uniform, stable and reproduced true to type in successive generations of asexual reproduction.

DESCRIPTION OF THE DRAWINGS

The accompanying color photographs depict characteristics of the new 'GRAPE LOLIPOP' plants as nearly true as possible to make color reproductions. The overall appearance of the 'GRAPE LOLIPOP' plants in photographs is shown in colors that may differ slightly from the color values described in the detailed botanical description.

FIG. 1 shows an overall view of the 'GRAPE LOLIPOP' plant from the side.

FIG. 2A shows a close view of a single leaf of the check variety BLK03 plant.

FIG. 2B shows a close view of a single leaf of the new variety 'GRAPE LOLIPOP' plant.

FIG. 3A shows top parts (including inflorescence) of the BLK03 plant from the side.

FIG. 3B shows top parts (including inflorescence) of the 'GRAPE LOLIPOP' plant from the side.

FIG. 4 shows a close view of flowers of the 'GRAPE LOLIPOP' plant at the early to mid flowering stages.

FIG. 5 shows another close view of flowers of the 'GRAPE LOLIPOP' plant at the early to mid flowering stages.

DETAILED BOTANICAL DESCRIPTION

'GRAPE LOLIPOP' has not been observed under all possible environmental conditions, and the phenotype may vary significantly with variations in environment. The following observations, measurements, and comparisons describe this plant as grown at Salinas, Calif., when grown in the greenhouse, nursery or field, unless otherwise noted.

Plants for the botanical measurements in the present application are annual plants. In the following description, the color determination is in accordance with The Royal Horticultural Society Colour Chart, 2007 Edition, except where general color terms of ordinary dictionary significance are used.

The *cannabis* plant disclosed herein was derived from female and male parents that are internally designated as below.

A GNBR internal Code of the *cannabis* plant named 'GRAPE LOLIPOP' is G2.C5P1.04. The additional number '.04' was only assigned to an individual plant (i.e. 'GRAPE LOLIPOP') selected from progenies of the cross event between pollen acceptor (G02) and pollen donor (C05.P01). 'GRAPE LOLIPOP' is a fertile hybrid derived from a controlled-cross between two proprietary cultivars: (i) GLD02 (pollen acceptor; female parent), also known as G02 or G2 and (ii) CBD05.P01 (pollen donor; male parent), also known as C05.P01 or C5P1. The name of the female parent, 'IOGA' disclosed in U.S. Provisional Patent Application Ser. No. 62/596,561 is a four letter production code for GLD02,

indicating that IOGA and GLD02 are the same plant. The female parent name was updated to GLD02 in the instant application. The initial cross between two parental cultivars was made in July 2015. The primary phenotypic criteria used to select the new and distinct *cannabis* cultivar disclosed herein is as follows: structure score, nose/organoleptic testing, mold susceptibility/resistance, and insect susceptibility/resistance. Also, the first asexual propagation of ‘GRAPE LOLIPOP’ occurred on Feb. 25, 2016 in Salinas, Calif.

The following traits in combination further distinguish the *cannabis* cultivar ‘GRAPE LOLIPOP’ from the check variety ‘BLK03’, which is set as a standard for phenotypic comparison. Tables 2 to 6 present phenotypic traits and/or characteristics of ‘GRAPE LOLIPOP’ compared to the check variety ‘BLK03’ as follows. All plants were raised together and evaluated when 100 days old (i.e., 25 days in vegetative stage, 15 days in propagation stage, and 60 days in flowering times).

TABLE 2

General Characteristics		
Characteristics	New Variety	Check Variety (BLK03)
Plant life forms	An herbaceous plant (herb)	An herbaceous plant (herb)
Plant growth habit	An upright, tap-rooted annual plant; forming fibrous roots when asexually propagated	An upright, tap-rooted annual plant; forming fibrous roots when asexually propagated
Plant origin	A controlled-cross between pollen acceptor (GLD02) and pollen donor (CBD05.P01)	A controlled-cross between pollen acceptor (GLD13) and pollen donor (BSIA)
Plant propagation	Asexually propagated by stem cuttings and cloning	Asexually propagated by stem cuttings and cloning
Propagation ease	Easy	Moderate
Height	1.0-2.5m	0.5-2.5m
Width	225 cm	119.5 cm
Plant vigor	High	Medium
Time to Harvest (Seed to Harvest)	11 weeks	8 weeks
Resistance to pests or diseases	Resistant to pest as follows: (1) Aphids species such as: Cannabis Aphids (<i>Phorodon cannabis</i>), Green Peach Aphid (<i>Myzus persicae</i>) (Sulzer), Foxglove Aphid (<i>Aulacorthum solani</i>), Peach Aphid (<i>Macromphum euphorbiae</i>), BlackBean Aphid (<i>Aphis fabae</i>); (2) Whitefly (<i>Trialeurodes vaporariorum</i>); (3) Lepidoptera species such as: Armyworm (<i>Spodoptera frugiperda</i>), Cabbage Whites (<i>Pieris rapae</i>), Painted Lady (<i>Vanessa cardui</i>), Lepidoptera sp.; (4) Leaf Miner (<i>Liriomyza sativae</i>)	Non-Resistant to two spotted spider mite or aphids, whitefly, but resistant to Lepidoptera species
Genetically-modified organism	NO	NO

TABLE 3

Leaf/Foliage		
Characteristics	New Variety	Check Variety (BLK03)
5 Leaf arrangement	Alternate	Alternate
Leaf shape	Palmately compound	Palmately compound
10 Leaf structure	Linear-lanceolate leaflet blades with glandular hairs; asymmetrical	Linear-lanceolate leaflet blades with glandular hairs
Leaf margins	Dentate, coarsely serrated, and the teeth point away from the tip	Dentate, coarsely serrated, and the teeth point away from the tip
15 Leaf hairs	Present on both upper and lower surfaces	Present on both upper and lower surfaces
Leaf length with petiole at maturity	28.5 cm	16.6 cm
Leaf width at maturity	9.6-17.6 cm	10.7 cm
20 Petiole length at maturity	7.9 cm	6.5 cm
Petiole color (RHS No.)	134A at day 5 of flowering; 45B at day 60 of flowering	140C
Intensity of petiole anthocyanin	Medium to Strong (late flowering stage)	Medium (vegetative stage); very strong (late flowering stage)
25 Stipule length at maturity	1.1 cm	0.7 cm
Stipule shape	Elliptical-linear	Elliptical
Stipule color (RHS No.)	134A	149B
No. of leaflets	7	5-7
30 Middle largest (longest) leaflet length	19.5 cm	9.8 cm
Middle largest (longest) leaflet width	3.1 cm	2.3 cm
35 Middle largest (longest) leaflet length/width ratio	19.5:3.1	9.8:2.3
No. teeth of middle leaflet (average)	42 (with leaflets containing multiple teeth)	25
40 Leaf (upper side) color (RHS No.)	134A	132A
Leaf (lower side) color (RHS No.)	140B	134D
45 Leaf glossiness	Strong at the upper surface	Strong
Vein/midrib shape	Obliquely continuous throughout leaflet	Obliquely continuous throughout leaflet
Vein/midrib color (RHS No.)	N144B	144C
50 Aroma	Sweet and Grenadine	Spicy

TABLE 4

Stem		
Characteristics	New Variety	Check Variety (BLK03)
55 Stem shape	Hollow and ribbed	Hollow, ribbed, textured
Stem diameter at base	6.3 cm	2.8 cm
60 Stem color (RHS No.)	150C	N144D
Depth of main stem	Shallow-Medium depending on plant size and maturity	Absent
rib s/grooves	13.4-26.3 cm	2.4-4.9 cm
Internode length		

TABLE 5

Inflorescence (Female/Pistillate Flowers)		
Characteristics	New Variety	Check Variety (BLK03)
Flowering (blooming) habit	Elongated compound cymes, from 1.0 m-2.0 m in length	Elongated compound cymes, from 0.5 m-1.2 m in length
Proportion of female plants	100% pistillate	100% pistillate
Inflorescence position	Above	Even
Flower arrangement thereafter	Cymose	Cymose (terminal bud matures, while lateral flowers mature)
Number of flowers per plant	115-165 per cyme	80-120 per cyme
Flower shape	Calcarate-urceolate	Calcarate-urceolate
Flower (individual pistillate) length	0.5 cm	0.7 cm
Flower (compound cyme) diameter	5.5 cm	3.8 cm
Corolla shape	No defined corolla	No defined corolla
Corolla size	n/a	n/a
Corolla Color (RHS No.)	n/a	n/a
Bract shape	Urceolate	Urceolate
Bract size	0.1-2.1 cm	0.2-0.8 cm
Bract color (RHS No.)	130A	N134C
Calyx shape	No defined calyx	No defined calyx
Calyx color (RHS No.)	n/a	n/a
Stigma shape	Linear	Acute
Stigma length	1.1 mm	2.2 mm
Stigma color (RHS No.)	30B	159D
Trichome shape	Capitate-stalked glandular	Capitate-stalked glandular
Trichome color (RHS No.)	157A before harvest, at day 45 of flowering	157A at day 40 in flowering
Other types of trichomes	Capitate sessile trichomes are present on the leaves of plants, as well as being noticed in the flowers (color: 157A at day 45 in flowering). During later flowering, i.e. day 50 to day 70 in flowering, the capitate stalked trichomes are present (color: N30B).	Capitate sessile trichomes are present, as well as being noticed in the flowers (color: 157A at day 40 in flowering). During later flowering, i.e. day 48 to day 60 in flowering, capitate stalked trichomes are present (color: N30B). Bulbous and non-glandular trichomes are also present and most noticeable on the petioles, stems, and leaves (color: 157A).
Terminal bud shape	Oblong-Rounded	Oblong
Terminal bud color (RHS No.)	134C	203C
Pedicel	Absent	Absent
Staminate shape	No staminate flowers produced naturally; however, male flower (staminate) can be induced with chemical compounds (such as silver nitrate and silver thiosulphate anionic complex).	No staminate flowers produced naturally; however, male flower (staminate) can be induced with chemical compounds (such as silver nitrate and silver thiosulphate anionic complex).

TABLE 5-continued

Inflorescence (Female/Pistillate Flowers)		
Characteristics	New Variety	Check Variety (BLK03)
Pollen description	Absent	Absent
Seed shape	Smooth and globular	Smooth and globular
Seed description	1.8-2.4 mm	1.8-2.3 mm
Marbling of seed	Medium	Absent (non-existent)
Petal description	Apetalous	Apetalous
Max THC content	About 3.09-7.59%	About 18.88-19.37%
Max CBD content	About 9.97-16.68%	0.00%
Max CBG content	About 0.21-0.70%	About 0.84-0.91%
n/a: not available		

TABLE 6

Other Characteristics		
Characteristics	New Variety	Check Variety (BLK03)
Time period and condition of flowering/blooming	7-9 weeks	7-9 weeks
Hardiness of plant	Hardy to 25 ambient temperature	Hardy to 25 ambient temperature
Breaking action	Flexible, highly resistant to breakage	Strong, non-flexible
Rooting rate after cutting/cloning	99%-vigorous	70%-moderate
Types of Cutting for Cloning	Stem	Stem
Shipping quality if available	Good	Moderate
Storage life if available	Long (5-10 months with minor changes in physical appearance and/or smell/taste); minor decrease in green coloration	Medium (2-6 months with minor changes in physical appearance and/or smell/taste)
Market use	Medicinal	n/a
Productivity of flower if available	Approximately 0.227-1.134 kg can be produced per plant, dependent on finished plant size (1.2-2.6 m); Growing conditions/environment will dictate final yield/output	Approximately 0.14-0.45 kg can be produced per plant; dependent on finished size (0.6-1.2 m); Growing conditions/environment will dictate final yield/output

In general, 'GRAPE LOLIPOP' is larger in width and height than both parents, (GLD02) and (CBD05.P01). 'GRAPE LOLIPOP' is more robust in terms of growing performance, time to rooted clones, and time to flower maturity. Also, 'GRAPE LOLIPOP' has greater resistance to pest and disease, stronger branches, thicker stems, greater flexibility, and higher yielding. 'GRAPE LOLIPOP' has larger and more flexible stems including both main and lateral, which allow for producing higher yields under different growing conditions. 'GRAPE LOLIPOP' clearly demonstrates hybrid vigor, and outperforms both parents overall. Chemically, 'GRAPE LOLIPOP' has a higher and completely different cannabinoid content, a higher THC: CBD ratio as well as a higher terpene content than either parent.

When 'GRAPE LOLIPOP' is compared to the check variety 'BLK03', 'GRAPE LOLIPOP' is wider than 'BLK03' in plant width. 'GRAPE LOLIPOP' shows higher plant vigor and longer time to harvest than 'BLK03'. In general, 'GRAPE LOLIPOP' has longer and wider leaflets than 'BLK03' in terms of whole leaf length and width. Also, 'GRAPE LOLIPOP' has longer and wider leaflets than 'BLK03' when comparing the middle largest leaflet length and width. Additionally, 'GRAPE LOLIPOP' has more teeth numbers in middle leaflet than 'BLK03'. 'GRAPE LOLIPOP' has a longer petiole and stipule in average than 'BLK03' at maturity. Regarding stem diameter at base, 'GRAPE LOLIPOP' is more than twice longer than 'BLK03' in average. The internode length of 'GRAPE LOLIPOP' is conspicuously longer than that of 'BLK03'. In terms of flower numbers per cyme, 'GRAPE LOLIPOP' has more flowers than 'BLK03'. When comparing the compound cyme diameter, 'GRAPE LOLIPOP' is longer than 'BLK03'. With respect to aroma, 'GRAPE LOLIPOP' have a sweet and grenadine scent, while 'BLK03' has a generally spicy smell.

When 'GRAPE LOLIPOP' is compared to the known *cannabis* plant named 'ECUADORIAN SATIVA' (U.S. Pat.

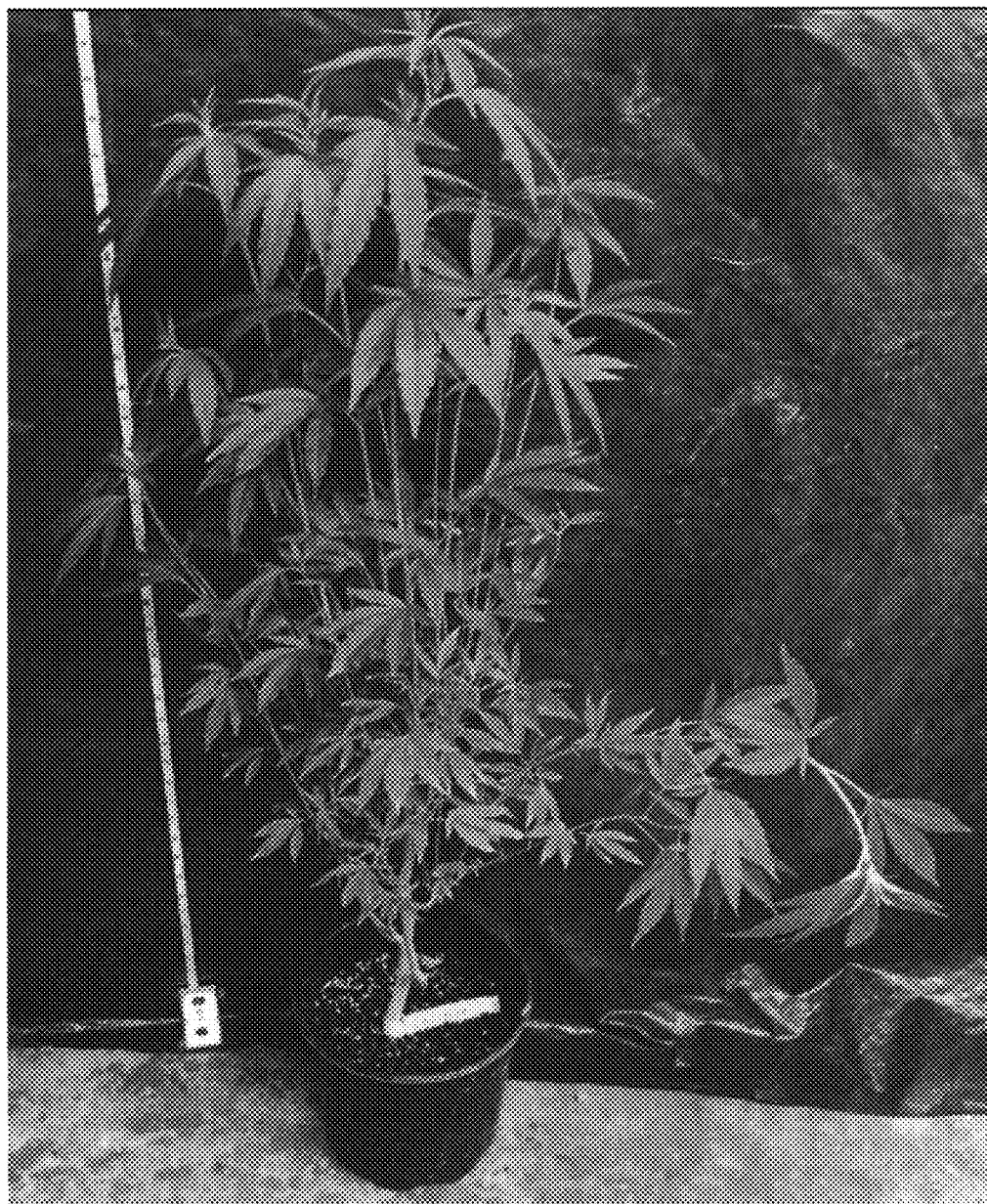
No. 27,475), there are several distinctive characteristics. For example, overall form of 'GRAPE LOLIPOP' plant is wider than the 'ECUADORIAN SATIVA' plant across at the widest point. 'GRAPE LOLIPOP' plant has a longer middle leaflet (without petiole) and whole leaf (with petiole) length than the 'ECUADORIAN SATIVA' plant. Generally, 'GRAPE LOLIPOP' plant has a shorter petiole at maturity than the 'ECUADORIAN SATIVA' plant. Also, 'GRAPE LOLIPOP' plant has a wider middle leaflet width than the 'ECUADORIAN SATIVA' plant. Regarding stem diameter at base, 'GRAPE LOLIPOP' is longer than 'ECUADORIAN SATIVA'. While the aroma of 'ECUADORIAN SATIVA' is strongly mephitic with hints of limonene, 'GRAPE LOLIPOP' has a sweet and grenadine scent. When comparing total THC content between 'GRAPE LOLIPOP' and 'ECUADORIAN SATIVA', the total THC content of 'GRAPE LOLIPOP' is between 3.09-7.59%, while 'ECUADORIAN SATIVA' accumulates 12.45% total THC.

The invention claimed is:

1. A new and distinct cultivar of *Cannabis* plant named 'GRAPE LOLIPOP' substantially as shown and described herein.

* * * * *

Figure 1



GRAPE LOLIPOP

Figure 2A



BLK03

Figure 2B



GRAPE LOLIPOP

Figure 3A



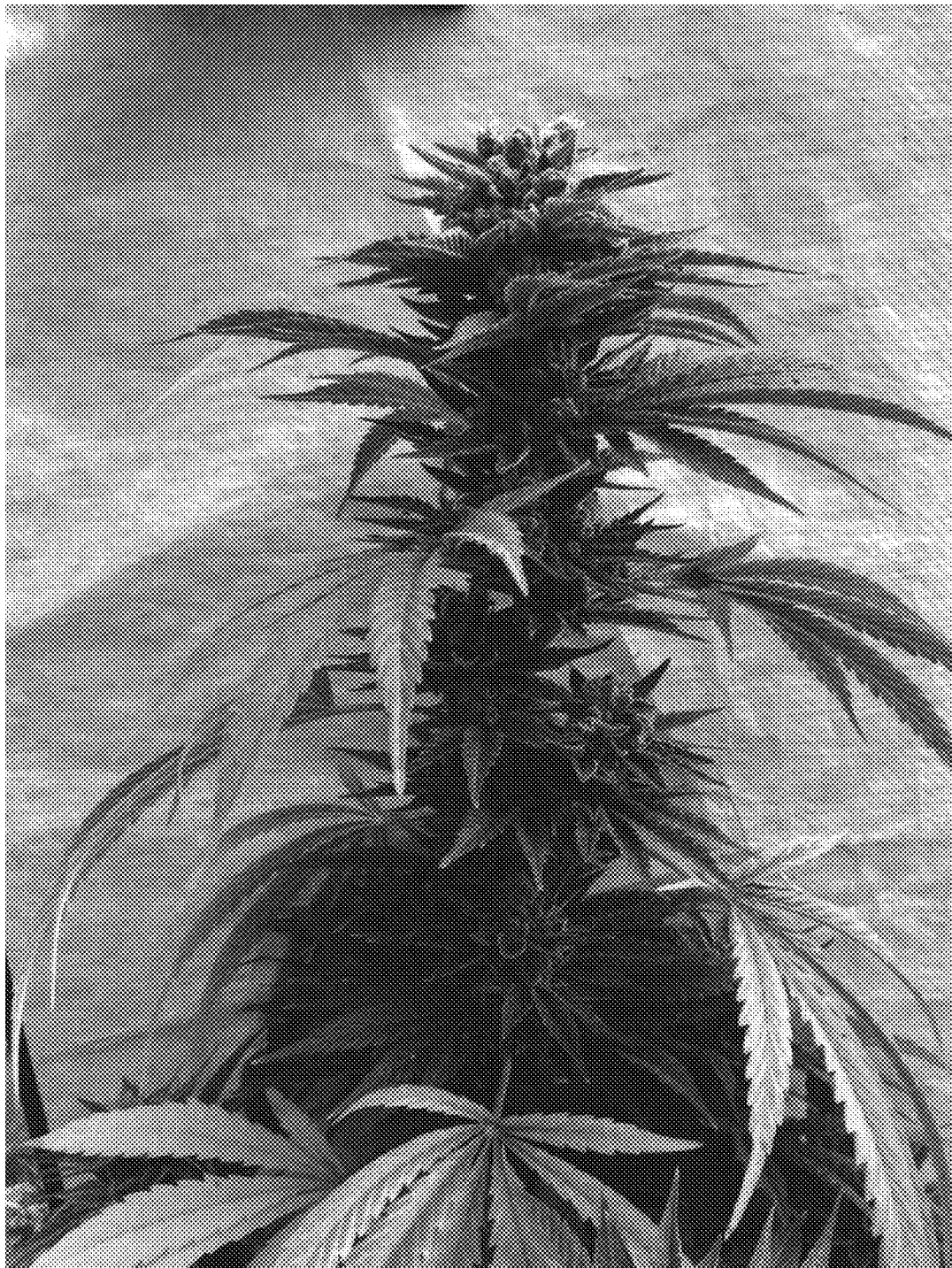
BLK03

Figure 3B



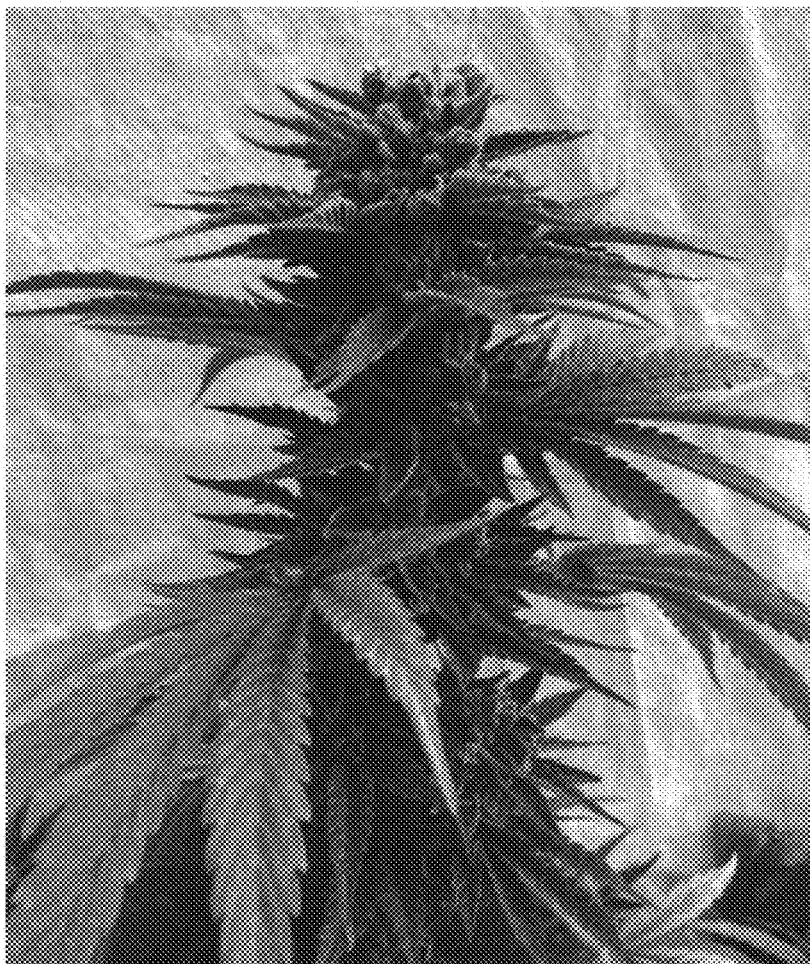
GRAPE LOLIPOP

Figure 4



GRAPE LOLIPOP

Figure 5



GRAPE LOLIPOP